

REMARKS

Claims 1-4 are rejected under 35 U.S.C. 102 (b) as being anticipated by Simpson et al (US 5,967,921).

Claim 1 recites elements and limitations not found in Simpson et al. (US 5,967,921) hereinafter "Simpson". Specifically, claim 1 recites a tensioner 21 comprised of an outer body 23 and an inner body 24. Claim 1 recites an outer body 23 provided with a tensioner mounting means, an inner body fitting hole 23a, and an inner body 24.

As used in Simpson reference injection molding is a process whereby plastic is injected into a cavity. Insert molding is a type of injection molding process whereby plastic is injected into a cavity around an insert piece placed into the molding cavity immediately prior to molding. Injection molding machines hold the molds in which the plastic is shaped. The cost of manufacturing molds depends on a large number of factors including complexity of the pieces, expected tool longevity, surface finishes, and other factors. Production rate is affected by the length of cycle time to produce each part. Insert molding requires greater cycle time which contributes to higher costs. In Simpson, a tensioner 100 includes a housing 102 having a bore 104. The bore 104 has an inner surface 106. A sleeve 105 is received within the bore of the housing body 102. The housing body 102 may be made of a plastic material such as polyphenylene sulfide with glass and mineral fillers. The sleeve 105 has an outer surface 108 having a plurality of projections or recesses 110. The sleeve 105 may be fixed within the bore 104 by using friction,

threads, mechanical interlocking, or insert molding.

Simpson lacks the claimed elements of inner body sealed to the outer body

Further, Simpson lacks an inner body heat sealed to an outer body. During the insert molding process of Simpson, the sleeve 105 is positioned in the housing 102 by first placing the sleeve 105 in a mold 700. Melted plastic is injected into the mold and surrounds the sleeve 105 within the mold and cools to form the housing body 102. The joining of the sleeve 105 and housing 102 may require an additional support element 114. The additional support element 114 may be a ring with a portion of the ring positioned within a groove 116 in the sleeve 105. Referring to Simpson, the plastic material is injected around the sleeve 105 to form a housing body 102 and tensioner 100. The outer surface of sleeve 105 has recesses therein which must be completely filled. However, it is likely that these recesses will not be completely filled thus creating a leak. In col. 3, line 51, Simpson states that "a leak-resistant" structure is formed. A seal is not formed in Simpson.

Injection molding and insert molding are subject to a number of critical defects such as delamination, jetting, embedded contaminants, burrs, warping, knit lines, voids, and gaps that can lead to problems in the housing body 102 and overall failure in the tensioner 100. These defects are especially problematic and affect the connection between the inner and the outer body of the tensioner of Simpson.

Further, in the insert molding of Simpson, the fitting force between an outer body (plastic resin) and an inner body (sleeve) is weak. The different coefficients of thermal expansion of the metal inner body and the plastic tend to generate gaps

therebetween at high temperature. As a result, the outer body of the tensioner is not heat sealed to the inner body.

Welding is a process in which two or more materials are joined together by application of heat, pressure, or a combination of both. Heat welding is an accurate localized method of welding and sealing plastics. Another localized method of welding and sealing thermoplastics is ultrasonic welding where heat is generated by vibration from ultrasonic energies. Localized heat is generated by the friction of vibration at the surfaces to be joined. Ultrasonic welding is also known as ultrasonic sealing. Welding in the present invention results in a uniform seal between the inner and the outer body of the device so that no leaks can occur.

The sealed structure in the present invention resulting from heat welding is different from the structure produced by injection molding and insert molding in the cited reference. A sealed connection between the housing (outer body) and sleeve (inner body) is made in the instant invention which does not require the use of additional supporting members or special assembly equipment. In the present invention, the inner body (sleeve) is cylindrical and is sealed to the outer body. As a result, durability and ease of manufacturing is increased.

In the present invention, the inner body 24, the plunger 26, the compression spring 27, the check valve 31, and the movement-backward preventing mechanism 32 are incorporated to complete the inner body side unit 33. Then, the inner body side unit 33 is press-fitted into the outer body 23, and a press-fitted portion of the inner body fitting hole 23a in the outer body 23 is fused and softened by an

ultrasonic welding machine. By both fusing and softening the press-fitting portion of the inner body fitting hole 23a and the outer body 23, no gap between the inner body forming the inner body side unit 33 and the inner body fitting body hole 23a of the outer body 23 exists and the inner and outer bodies are completely sealed. Leakage from the gap is prevented and additional supporting members such as O-rings are not necessary as a result of this direct sealing engagement. However, the cited reference lacks this direct sealing structure and other supporting members such as O-rings are used.

In the claimed invention, ultrasonic welding creates an integrated bond between plastic and metal forming a seal between the inner body and outer body.

Claim 1 is believed to be in condition for allowance. Claims 2-4 are dependent on claim 1 and are also believed to be allowable. Reconsideration of claims 1-4 is respectfully requested.

Applicant wishes to thank the Primary Examiner for her consideration of this application.

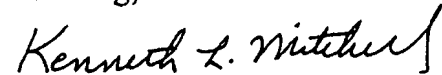
The undersigned invites a telephone call from the Primary Examiner if it would expedite the processing and examination of the application.

Further, if there are any additional charges, or any overpayment, in connection herewith, the Commissioner is hereby authorized to charge any such deficiency, or credit any such overpayment, to Deposit Account No. 23-3060. This response is believed to be timely, however, in the event that the Commissioner deems it to be untimely, then please consider this as a petition for extension of time

with authorization to charge deposit account 23-3060 therefor.

Respectfully Submitted

Woodling, Krost and Rust

A handwritten signature in black ink, reading "Kenneth L. Mitchell". The signature is written in a cursive style with a large, stylized "K" and "M".

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